

CLAIMS

1. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula:

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Ln_xCa_{x'}A_{x"}Mn_yB_{y'}O_{3-δ}

wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

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A is selected from the group consisting of Sr, Ba and Y;

B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

 $0.1 \le x \le 0.9$; $0.1 \le x' \le 0.9$; $0 \le x'' \le 0.5$;

0.5 < y < 1.2; and $0 \le y' \le 0.5$;

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provided that x + x' + x'' = 1 and 1.2 > y + y' > 1.0

wherein $\,\delta$ is a number which renders the composition of matter charge neutral.

- 2. The interconnect of claim 1 wherein Ln is La.
- 20 3. The interconnect of claim 1 wherein A is Sr.
 - 4. The interconnect of claim 1 wherein B is Co.
 - 5. The interconnect of claim 1 wherein $0.3 \le x \le 0.7$ and $0.3 \le x' \le 0.7$.

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- 6. The interconnect of claim 1 wherein x" is 0.
- 7. The interconnect of claim 1 wherein 0.9 < y < 1.2 and 0 < y' < 0.1.
- 30 8. The interconnect of claim 1 wherein y' is 0.
 - 9. The interconnect of claim 1 wherein Ln is La, A is Sr, B is Co, $0.3 \le x \le 0.5$; $0.5 \le x' \le 0.7$; $0 \le x'' \le 0.2$; 0.9 < y'' < 1.05; and $0 \le y'' \le 0.1$; provided that x + x'' + x'' = 1 and $1.05 > y + y' \ge 1.02$.

10. An interconnect for an electrically driven solid electrolyte oxygen separation device comprising a composition of matter represented by the general formula

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$Ln_xCa_{x'}Mn_vO_{3-\delta}$

wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

 $0.1 \le x \le 0.9$; $0.1 \le x' \le 0.9$; and

10 1.0 < y < 1.2;

provided that x + x' = 1, and

wherein $\,\delta$ is a number which renders the composition of matter charge neutral.

11. The interconnect of claim 10 wherein 0.3 < x < 0.7.

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12. The interconnect of claim 10 wherein Ln is La, $0.3 \le x \le 0.5$ and 1.0 < y < 1.05.

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13. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula

$Ln_xCa_{x'}A_{x''}Mn_yB_{y'}O_{3-\delta}$

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wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

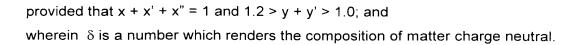
A is selected from the group consisting of Sr, Ba and Y;

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B is selected from the group consisting of Cu, Co, Cr, Fe, Ni, Zn, Nb, Zr, V, Ta, Ti, Al, Mg, and Ga;

 $0.1 \le x \le 0.9$; $0.1 \le x' \le 0.9$; $0 \le x'' \le 0.5$;

0.5 < y < 1.2; and $0 \le y' \le 0.5$;



- 14. The electrochemical solid-state device of claim 13 wherein Ln is La, A is Sr, B is Co, $0.3 \le x \le 0.5$; $0.5 \le x' \le 0.7$; $0 \le x'' \le 0.2$; 0.9 < y < 1.05; and $0 \le y' \le 0.1$; provided that x + x' + x'' = 1 and $1.05 > y + y' \ge 1.02$.
 - 15. An electrochemical solid-state device comprising at least two electrochemical cells which are electrically connected in series by one or more interconnects wherein at least one interconnect comprises a composition of matter represented by the formula:

Ln_xCa_x,Mn_yO_{3-δ}

15 wherein

Ln is selected from the group consisting of La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu;

$$0.1 \le x \le 0.9$$
; $0.1 \le x' \le 0.9$;

20 provided that x + x' = 1; and

wherein δ is a number which renders the composition of matter charge neutral.

16. The electrochemical solid-state device of Claim 15 wherein Ln is La, $0.3 \le x \le 0.5$ and 1.0 < y < 1.05.

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